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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/019,479	04/26/2002	Monika Bauer	05788.0198	4054
22852	7590	03/18/2004		
			EXAMINER	
			HU, HENRY S	
			ART UNIT	PAPER NUMBER
			1713	

DATE MAILED: 03/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	10/019,479	BAUER ET AL.
	<b>Examiner</b>	<b>Art Unit</b>
	Henry S. Hu	1713

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on \_\_\_\_.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 6-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_ is/are allowed.
- 6) Claim(s) 6-11 is/are rejected.
- 7) Claim(s) 6 and 9 is/are objected to.
- 8) Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 12-31-01.
- 4) Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_ .
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: \_\_\_\_ .

The pre-amendment on claim and specification was filed on December 31, 2001, wherein Claims 1-5 were cancelled and new Claims 6-11 were added. The Applicants have added the foreign priority information on PCT/EP00/06205 in the beginning of page 1. **Claims 6-11 are pending now.** An action follows.

## **DETAILED ACTION**

### *Specification*

1. The disclosure is objected to because of the following informalities:
  - (a) On page 1 at lines 2 and 6, recitation of “poly(perfluorocyclobutanes)” may be improper since it means **a copolymer of various perfluorocyclobutane monomers**. The examiner suggests using “polyperfluorocyclobutanes” as disclosed on page 2 at line 20. By doing so, the definition of polyperfluorocyclobutanes is the same as that of **polycyanurates or polyarylsulfones** (page 2, line 13-14; page 2, line 32).

Appropriate corrections for (a) and (b) are required.

### *Claim Objections*

2. Claims 6 and 9 are objected to because of the following informalities:

(a) On **Claim 6** at bottom three lines, phrase of “NR<sup>9</sup> whereby R<sup>9</sup> is hydrogen or C<sub>1</sub>-C<sub>10</sub> alkyl” is better to move to the end of sentence. A rewriting is needed. Otherwise, “N=N, CH=CH, and …” may be relating to the R<sup>9</sup> group of NR<sup>9</sup>.

(b) On **Claim 9** at bottom line 2, recitation of “glycidethers” is improper and should be changed to one common name of “glycidylethers”. Please refer to Aldrich chemical catalog for Glycidyl isopropyl ether, the compound # 47,365-0.

(c) On **Claim 9** at lines 4-5, phrase of “optionally at least one difunctional cyanate of formula II” is better to move to the end of sentence. A rewriting is needed. Otherwise, “and at least one of the following compounds” may be in optional use.

*Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

- (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. *The limitation of new parent Claim 6 of the present invention relates to an optical waveguide system or waveguide structure comprising at least (a) a first material which is a poly(perfluorocyclobutane), and in direct contact with this material (b) a second material which is a polycyanate resin, wherein the polycyanate resin has been (co)polymerized from at least one difunctional cyanate of formula (I) as specified in Claim 1. See other limitations of dependent Claims 7-11.*

5. Claims 6-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kennedy et al. (US 5,246,782) in view of Bauer et al. (US 5,780,159).

Regarding the limitation of parent **Claim 6**, Kennedy et al. disclose the preparation of a laminate having unique properties useful for making optical waveguide and optical cladding (abstract, line 1-15; column 4, line 29-32). Kennedy et al. further disclose the **laminate has at least two layers, at least one of which comprises a polymer having more than one perfluorocyclobutane group** (abstract, line 1-3). It is noted that the architect of laminate reads on the limitation of “the first polymer (a) is in direct contact with the second polymer (b)” in view of the layered structure.

6. With respect to **the layer(s) other than** the layer(s) of polymer having perfluorocyclobutane (PFCB or FPAE) rings **are epoxy resins, polyimides, benzocyclobutane (BCB) polymers, other thermosets, and the like** (column 2, line 23-43). **The preferable one is a thermoset polymer with different structure, composition and crosslinking type.**

However, the Kennedy reference is silent about specifically using polycyanates, which are crosslinkable thermoset. Bauer et al. teach that **polycyanate** (or called **polycyanurate**) has been the major component in the course of making an optical waveguide, the advantage is that crosslinking can be easily obtained through **the formation of a triazine ring**, a practical process is thereby of high processability and low density and does not require excessive high temperature (abstract, line 1-4; column 1, line 9-18).

7. **In view of the fact that both polycyanate and polyperfluorocyclobutane have been useful in making optical waveguide as well as other materially different thermosetting crosslinkable polymer is preferably used in the form of laminate when polyperfluorocyclobutane is used as one of the layer.** Therefore, one having ordinary skill in the art would have found it obvious to apply Bauer's polycyanate as the other polymer layer in the form of laminate as taught by Kennedy. By doing so, one would expect such a combination in the structure of laminate would make an effective process due to an easy triazine-crosslinking mechanism from polycyanate; a practical waveguide with all the required properties can be thereby obtained.

8. Regarding **Claims 7-8**, Bauer et al. have taught the use of various claimed **dicyanates** as shown on column 2, line 13 – column 3, line 40. It is noted **some dicyanates carry fluorine atoms** (column 2, line 37).

Regarding **Claim 9**, Bauer et al. have taught the use of **various claimed phenol or aromatic glycidyl ethers** mixed with the cyanate monomers in order to improve the performance properties of polycyanates (column 2, line 63 – column 3, line 50).

Regard **Claim 10**, Kennedy et al. disclose the preparation of a laminate **having at least two layers** and with unique properties useful for making optical waveguide and optical cladding (abstract, line 1-15; column 4, line 29-32) as discussed in the rejection of Claim 6. **With respect to Claim 11**, Kennedy et al. have already disclosed **the use of above-mentioned laminated layers in the area of optical cladding** (column 4, line 29-32), the architect of such layer/buffer combination is thereby anticipated by Kennedy as well as from the art.

### *Conclusion*

9. The prior art made of record and not relied upon is considered pertinent to applicants' disclosure. The following references relate to an optical waveguide comprising a poly(perfluorocyclobutane) in direct contact with a polycyanate resin:

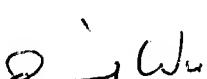
US Patent No. **4,528,366** to **Woo** et al. only discloses a process to prepare polytriazines from aromatic polycyanates with cobalt salt of a carboxylic acid as catalyst (abstract, line 1-5). Woo also discloses that **monocyanates can be mixed with dicyanates or polycyanates to modify the properties** (column 8, line 39-46). However, the bilayered combination of poly(perfluorocyclobutane) in direct contact with a polycyanate is not disclosed.

10. Any inquiry concerning this communication or earlier communication from the examiner should be directed to **Henry S. Hu** whose telephone number is **(571) 272-1103**. The examiner can be reached on Monday through Friday from 9:00 AM –5:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached on (571) 272-1114. The fax number for the organization where this application or proceeding is assigned is (703) 872-9306 for all regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <<http://pair-direct.uspto.gov>>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Henry S. Hu

March 11, 2004

  
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